HONG KONG MONETARY AUTHORITY

REAL ESTATE PRICES AND CORPORATE BORROWING IN MAINLAND CHINA *

Key points:

- *Soaring property prices in Mainland China have raised concerns over the significance of real estate cycles on financial stability. While the direct effect of a real estate boom-bust cycle on financial stability through loans to property developers and mortgages is likely to be manageable, property is being widely used as collateral for bank lending in Mainland China, and the indirect effect through this channel remains less clear.*

- *This paper adds to our understanding of the issue by studying how valuation changes of property may affect the debt dynamics of firms. Using annual financial data of Mainland listed companies over the period 2007-2015, this study finds a significant positive correlation between firms' debt growth and property price changes in recent years. This phenomenon is particularly pronounced for smaller or private firms, which are deemed to be more financially constrained compared to larger or state-owned enterprises.*

- *Our findings suggest that the collateral-based lending system to some extent helps alleviate financing difficulties facing smaller or private Mainland firms as the Mainland financial sector remains underdeveloped. However, the use of properties and land as collateral may lead to a pro-cyclical swing in the indebtedness of smaller or private firms. In this sense, the exposure of banks to property markets through the collateral channel also warrants close monitoring together with banks' direct exposure.*

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I. INTRODUCTION

Property prices in Mainland China have picked up notably since 2015. In first-tier cities including Beijing, Shanghai, Guangzhou and Shenzhen, property prices have, on average, jumped by nearly 60% in the past two years (Chart 1). Following the price rally in first-tier cities, second-tier cities have also recorded solid increases in property prices since 2016. The soaring property prices have raised concerns, given the strong link between real estate cycles and financial stability.

Chart 1: Residential prices in Mainland China by tier of cities
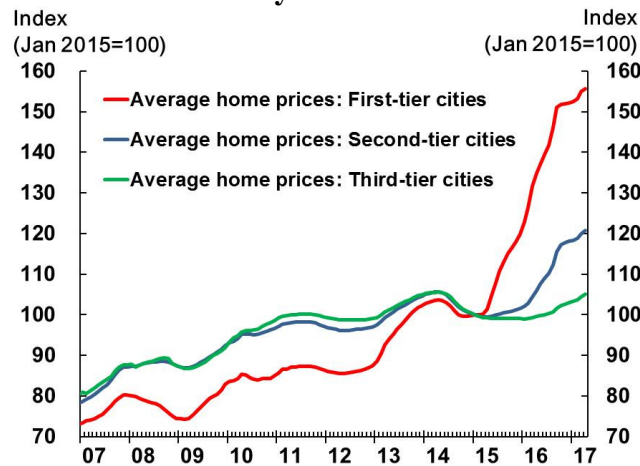
Sources: CEIC and staff calculations.

For now, the direct exposure of banks to the property market should be manageable. First, the size of the direct exposure of banks to the property market is not very large. By June 2017, only 6% of bank loans had been extended to developers. The share of mortgages in total bank loans was a little higher at around 18%. Second, or more importantly, in view of the potential risks associated with overheated property markets, Mainland authorities had already rolled out prudential measures. For instance, banks had tightened their loan underwriting standards to developers, especially the smaller and more vulnerable ones. For mortgage borrowers, their leverage level remained low thanks to macro-prudential measures in place, such as the increased down payment ratio requirements. By June 2017, the outstanding size of mortgages was only equivalent to around 35% of the total household

deposits.

While the direct exposure of banks to the property market should be manageable, the bank exposure to the property market through the collateral channel should not be ignored, given the key role played by the property market in the collateral-based lending system in Mainland China.

In particular, to access credit in financial markets, most borrowers in Mainland China are required to hold collateral. According to the latest World Bank Enterprise Survey, collateral was required for around 80% of corporate loans in Mainland China in 2012. On average, the value of collateral was around 200% of the loan borrowed. In comparison, in some economies, such as the US and Italy where bank lending is risk-based, most borrowers can still access credit, even if they do not hold collateral (Kunieda and Shibata (2011) and Fabbri and Padula (2004)).

Moreover, the majority of collateral for loans required by Mainland banks seemed to be properties and land following the development of the real estate markets. According to the statistics compiled by the Ministry of Land and Resources, the total area of land being used as collateral in 84 major cities increased notably by about 120% from 2009 to 2015 (Chart 2). The amount of loans backed by land also rose from RMB 2.6 trillion to RMB 11.3 trillion during the same period. The amount of bank loans secured by land and properties together could be even larger, but there is little publicly available information on this. Some anecdotal evidence, for instance, a report by the IMF issued in 2011, pointed out that 30-45% of loans in the five biggest Mainland banks were found to be backed by collateral, the majority of which was real estate.

**Chart 2:Land area pledged as collateral in
84 major cities**
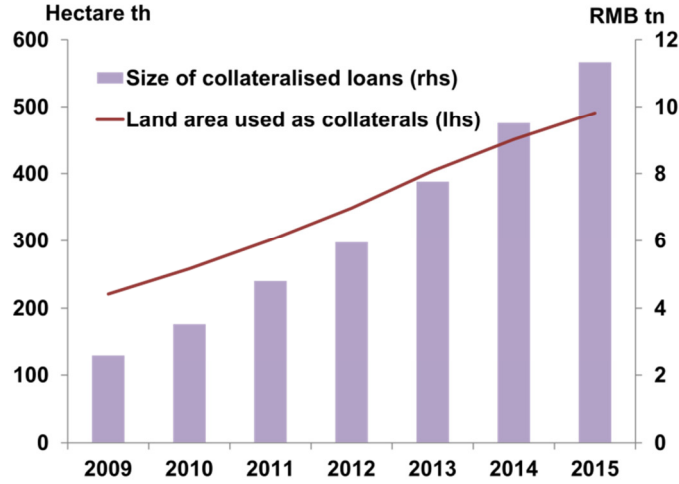
Sources: Ministry of Land and Resources

Given the key role played by the property market in the collateral-based lending system in Mainland China, it is not surprising that property prices, or the value of collateral, will affect firms' borrowing behaviour and therefore banks' exposure to the property market as well as loan quality. However, there have been few studies on this issue, most likely due to data limitation. To fill this gap and shed some light on the risk associated with banks' exposure to the property market, this study looks at the effect of property prices on corporate borrowing through the collateral channel.

II. EMPIRICAL FRAMEWORK AND DATA

To estimate how property prices, or the value of collateral, could affect firms' borrowing behaviour, we employ the approach of Banerjee and Blickle (2016), and Adelino et. al. (2015) to explain the growth of corporate debt by the following set of variables,

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\begin{aligned}
D_{i,t} = \alpha_0 &+ \beta_1 HP_t^l + \beta_2 cash_{i,t-1} + \beta_3 leverage_{i,t-1} + \beta_4 profit_{i,t-1} \\
&+ \beta_5 sales_{i,t-1} + \alpha_5 industrysales_{i,t} + \alpha_6 provincial\_GDP_t^l \\
&+ \gamma_t + \delta_i + \varepsilon_{i,t}
\end{aligned}
\tag{1}
$$

where $D_{i,t}$ is firm i's debt growth in year t proxied by the change in firm i's total liabilities and HP_t^l is the change in the average property price in province l in year t where the head office of the firm i is located[1]. Therefore, the coefficient β_1 is of the key interest.

Apart from the changes in property prices, firm characteristics such as cash position ($cash_{i,t-1}$, proxied by cash to sales ratio), leverage ($leverage_{i,t-1}$, proxied by debt to asset ratio), profitability ($profit_{i,t-1}$, measured by EBIT to sales ratio) and total sales ($sales_{i,t-1}$) that can reflect a firm's financial positions or operating conditions are also included in the specification, as these factors are relevant to the firm's demand for funds as well as the availability of funds for the firm.

To single out the collateral effect of property prices on corporate borrowing, we also include some controlling variables. For instance, industrial sales growth, $industrysales_{i,t}$, is included to control for the fact that firms borrow more not because of increased collateral value, but because these firms are in the property-related industries and therefore borrow more to expand when the property market booms. Provincial GDP growth, $provincial\_GDP_t^l$, is also included as higher GDP growth may lead to both higher property prices and faster loan growth in a particular province. In addition, time dummy, γ_t, is added to the specification to control for other common factors such as monetary conditions that may drive both overall debt growth and property prices. δ_i is the firm-level dummy.

The data employed in this study includes an unbalanced panel dataset covering around 2,600 non-financial listed Mainland companies from 2007 to 2015. As this study focuses mainly on the exposure of banks to the property market through the collateral channel, property developers are therefore excluded from our sample. Since there is no official data on

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[1] One concern is that a firm's borrowing may not be sensitive to the change in property prices in the province where the firm's headquarter is located, as it is possible that a firm may operate in different provinces and thus may borrow mainly from local banks where the firm operates. Our analysis finds that in our sample firms are indeed sensitive to the change in property prices in the province where their headquarters are located.

provincial level property prices, the property price data in our study is derived from the total value of properties sold in the primary market of a province and the total floor space transacted in the market, reported by the National Bureau of Statistics.

III.   EMPIRICAL RESULTS

Our results of the panel data analysis suggest that on average the debt growth of Mainland corporates seemed to have increasingly reacted to housing prices. Specifically, the results of the benchmark regression suggest that property prices appeared to have little impact on corporate debt growth in an earlier sample period from 2007 to 2010, as the coefficient is not significant (Table 1).   In more recent years, however, Mainland corporate debt growth seemed to have positively reacted to property prices. In particular, our results show that for the sample period 2011-2015, on average a one percentage point increase in housing price growth would lead to around a 0.9 percentage point increase in corporate debt growth.

One interesting question is whether borrowings by financially constrained firms in Mainland China would have reacted differently to housing prices compared to large or state-owned enterprises (SOEs) which usually have better access to credit markets. By financially constrained firms, we refer to either firms with the smallest 30% of asset size in the sample, or firms that are not state-owned enterprises.   To answer this question, we introduce the interaction term between a dummy variable for financially constrained firms and the changes in housing prices into the specification[2]. If property prices matter more for financially constrained firms, a statistically significantly positive coefficient of the interaction term should be detected.

Our results indeed pointed to a positive and statistically significant coefficient for the interaction term between smaller firms and housing price growth for the sample period 2011-2015 (Table 1), suggesting that house prices were more relevant for smaller firms to get access to credit

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[2] There is no need to include the dummy variable for financially constrained firms into the specification as firm-level dummies have already been included in the panel regression.

markets in recent periods. However, the coefficient of the interaction term between non-SOEs and housing price growth is found to be positive, but not statistically significant for the sample period 2011-2015. In comparison, the borrowing by larger firms or SOEs in Mainland China is found, in general, to be little affected by property price changes.

In a robustness check, we divide our sample by smaller versus larger firms and non-SOEs versus SOEs, and then re-estimate our model for each sub-sample for the period of 2011-2015. The results of the split sample analyses are reported in Table 2. The coefficients of housing price growth for the sub-samples of smaller firms and non-SOEs are found to be statistically significantly positive, while the coefficients of housing price growth for larger firms and SOEs are found to be statistically insignificant. This suggests that the strong correlation between housing price changes and corporate debt growth for the full sample is likely driven by smaller or private firms, which are deemed to have difficulty in gaining access to financial markets.

These findings actually help alleviate the concern that our results are driven by reverse causality, that is, firms borrow to invest in property markets and thus drive up property prices. If this is the case, we should have observed a much stronger correlation between the debt growth of financially less constrained firms and property prices. Instead, we find the opposite.

IV. CONCLUSION

Using data of non-financial listed companies and provincial property prices in Mainland China, this study finds that collateral value matters for corporate borrowing in recent years. In particular, we find that property price changes positively affect firms' debt growth, especially for financially constrained firms such as smaller and non-state-owned companies.

Our findings, therefore, suggest that collateral-based lending

may help alleviate financing difficulties facing smaller or private Mainland firms, given that the Mainland financial sector remains under-developed and information asymmetries prevail.

However, the use of properties and land as collateral may lead to a pro-cyclical swing in the indebtedness of smaller or private firms. For instance, a property market boom may result in faster accumulation of corporate debt, which may in turn exacerbate the vulnerability facing the financial system. A property market bust, on the other hand, may lead to a sudden decline or even a stop in bank lending to corporates, which would, in turn, cause refinancing problems for firms, or even jeopardise firms' business operations and therefore their repayment ability. Meanwhile, the declines in collateral value would also result in a deterioration in loan quality.

In this sense, the exposure of banks to property markets through the collateral channel also warrants close monitoring together with banks' direct exposure.

Our study, however, has some caveats. First, the sample period is relatively short due to data limitation. Secondly, this study tried to link property prices to corporate borrowing in Mainland China. However, Mainland property markets have barely experienced meaningful busts during our sample period. Lastly, this study focuses only on banks' exposure to the property market through the collateral channel, although property markets can indirectly affect financial stability through many other ways. For instance, property prices can affect the revenue of local governments as well as the profitability of local government financing vehicles, and, in turn, their repayment ability. Also, the wealth of households and the growth in upstream and downstream industries of the property sector can also be affected by property market performance, which would also have a feedback effect on banks' asset quality and therefore financial stability. These indirect effects of the property market on financial stability are not covered in this study, which therefore warrant further research.

REFERENCES

Adelino, Manuel, Schoar, Antoinette, and Severino, Felipe. 2015. "House Prices, Collateral, and Self-employment", Journal of Financial Economics, 117, pp. 288-306.

Banerjee, Ryan N., and Blickle, Kristian S. 2016. "Housing Collateral and Small Firm Activity in Europe", BIS Working Papers, no. 575.

Fabbri, Daniela and Padula, Mario. 2004. "Does poor legal enforcement make households credit-constrained?" Journal of Banking and Finance, 28(10): 2369-2397.

Kunieda, Takuma and Shibata, Akihisa. 2011. "Collateral Constraints and Legal Protection of Lenders: A Macroeconomic Perspective," MPRA Paper 35356, University Library of Munich, Germany.

Table 1: Corporate debt growth and housing price changes in Mainland China: estimation results of Equation (1)

	Full sample			2007-2010			2011-2015		
	Benchmark	Smaller firms as financially constrained firms	Non-SOEs as financially constrained firms	Benchmark	Smaller firms as financially constrained firms	Non-SOEs as financially constrained firms	Benchmark	Smaller firms as financially constrained firms	Non-SOEs as financially constrained firms
Cash (t-1)	-0.013***	-0.013***	-0.013***	0.016	0.016	0.016	-0.025***	-0.026***	-0.025***
Leverage (t-1)	-0.263***	-0.262***	-0.262***	-0.449***	-0.449***	-0.445***	-0.839***	-0.853***	-0.842***
Profitability (t-1)	-0.002**	-0.002**	-0.002**	-0.004**	-0.004**	-0.004**	-0.241***	-0.241***	-0.241***
Sales (t-1)	-0.941***	-0.940***	-0.941***	-0.825***	-0.825***	-0.825***	-1.925***	-1.932***	-1.926***
Industry sales (t)	0.253*	0.252*	0.248*	-0.250*	-0.249*	-0.247*	0.213	0.176	0.201
Provincial GDP growth (t)	-1.236	-1.239	-1.257	0.776	0.783	0.775	-3.855	-3.691	-3.743
House price (t)	0.363	0.392	0.597*	-0.021	-0.066	-0.331	0.927**	0.414	0.644
House price (t)* dummy for financially constrained firms		-0.139	-0.422		0.271	0.661*		1.970**	0.462
Total effect of house price (t)	*0.363*	*0.253*	*0.175*	*-0.021*	*0.206*	*0.330*	*0.927**￼*	*2.384***￼*	*1.106**￼*
Fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.221	0.221	0.221	0.320	0.321	0.321	0.373	0.374	0.373

Note: ***, ** and * denote the estimated coefficient is statistically significant at 1%, 5% and 10% respectively.   Smaller firms include firms with the smallest 30% of asset size.   Non-SOEs are non-state-owned enterprises.   The total effect of house price is the sum of the coefficients of house price and house price*dummy for financially constrained firms (if applicable).

Table 2: Corporate debt growth and housing price changes in Mainland China: Split-sample estimation results for 2011-2015

	Smaller vs larger firms		Non-SOEs vs SOEs	
	Small	Large	Non-SOEs	SOEs
Cash (t-1)	-0.024***	-0.140***	-0.030***	-0.582***
Leverage (t-1)	-0.313*	-2.822***	-0.780***	-2.496***
Profitability (t-1)	-0.084	0.002	-0.248***	-0.031
Sales (t-1)	-1.899***	-1.949***	-2.412***	-1.093***
Industry sales (t)	-0.137	0.214	-0.088	0.170
Provincial GDP growth (t)	-16.191**	-1.411	-10.658***	0.810
House price (t)	2.689***	0.227	1.664***	0.395
Fixed effect	Yes	Yes	Yes	Yes
Time effect	Yes	Yes	Yes	Yes
R-squared	0.423	0.348	0.388	0.343

Note: ***, ** and * denote the estimated coefficient is statistically significant at 1%, 5% and 10% respectively.   Smaller firms include firms with the smallest 30% of asset size.   Non-SOEs are non-state-owned enterprises.